

# **TorqueStar Opta & DTT Opta**

## **Operator's Manual Manual 890: Issue 7**

**Crane Electronics Ltd**

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# OPERATOR'S MANUAL



## CE MARKING

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Declares that this product has been assessed and complies with the requirements of the relevant CE Directives.



## HOW TO USE THIS MANUAL

This manual covers both the TorqueStar Opta and the DTT Opta. As they share similar software and many features are common to both devices, the manual is split into 2 sections. The 1st (main) section covers the operating instructions for the TorqueStar Opta and the 2nd section covers only areas where the operation of the two devices differs. This includes the integral printer of the DTT Opta and its interchangeable transducer modules.

Any DTT Opta procedures not mentioned specifically in the 2nd section, can therefore be taken from the TorqueStar Opta instructions.

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### PACKING LIST

The following items are supplied with the TorqueStar unit.

1 x TorqueStar Opta Digital Torque Reader	1 x User Manual (this book)	1 x Camera (Neck) Strap
1 x Quick start guide	1 x Mains adaptor/charger	1 x Menu Navigation Guide

Please check these items are all present and notify Crane immediately of any shortages.

### CARE & STORAGE

This unit is designed for indoor use only

Operating temperature range                      5-40 degrees C

Storage temperature range                          0-50 degrees C

The membrane keypad may be wiped clean with a soft damp cloth. The unit is not waterproofed and spillages should be avoided.

THIS UNIT CONTAINS NO USER SERVICEABLE PARTS. ONLY QUALIFIED SERVICE PERSONNEL SHOULD REPLACE OR FIT PARTS.

### BATTERIES

#### Standard TorqueStar Opta

The battery in the Standard Charge unit is a NiMH (Nickel Metal Hydride).

From fully discharged, the unit will require a 16 hour charge for normal use.

When the mains adaptor is plugged into the socket and switched on at the mains, the **red** LED will come on to indicate the Opta is charging correctly.

#### Optional Fast Charge Opta

TorqueStar Optas with optional Fast Charge, are supplied with internal NiMH (Nickel Metal Hydride) batteries. From fully discharged, the unit will require a charging period of only 2.5 hours approx. Opta models having this feature are identified by a tick in the features list - see Unlock feature, page 28.

If the Opta is a fastcharge unit, the **green** LED will come on to indicate the Opta is charging and will start to flash when the unit is fully charged. If the **red** LED comes on, this means there is a problem and usually indicates a faulty battery.

**NOTE:** The mains adapter for the Fast Charge model terminates in a slightly larger diameter plug. This prevents the use of a standard mains adapter for charging the fast charge batteries. No attempt should be made to recharge the batteries using the standard mains adapter - failure to heed this warning could result in damage to the unit.



## **OVERVIEW - TORQUESTAR OPTA**

TorqueStar *Opta* is the equipment of choice for the measurement and collection of torque data in the manufacturing environment.

TorqueStar *Opta*'s range of software features can be individually specified to give a configuration most suited to the requirement, from a simple no-frills read-out to a comprehensive audit tool with display of torque curves and specialist measurement routines.

The basic TorqueStar *Opta* performs bi-directional measurement of torque, angle and pulse count in track, peak, click and pulse measurement modes. For additional information, cycle time duration and tool speed can also be displayed.

Time and date stamped readings can be set to print automatically. The easy to read display gives a simultaneous view of all relevant information during the measurement process, while the simple alphanumeric keypad enables fast data entry when required.

Light enough for carrying on a neckstrap, yet robust to withstand the rigours of the factory environment, TorqueStar *Opta* also sports integrated rubber bumpers to protect finished product from accidental damage.

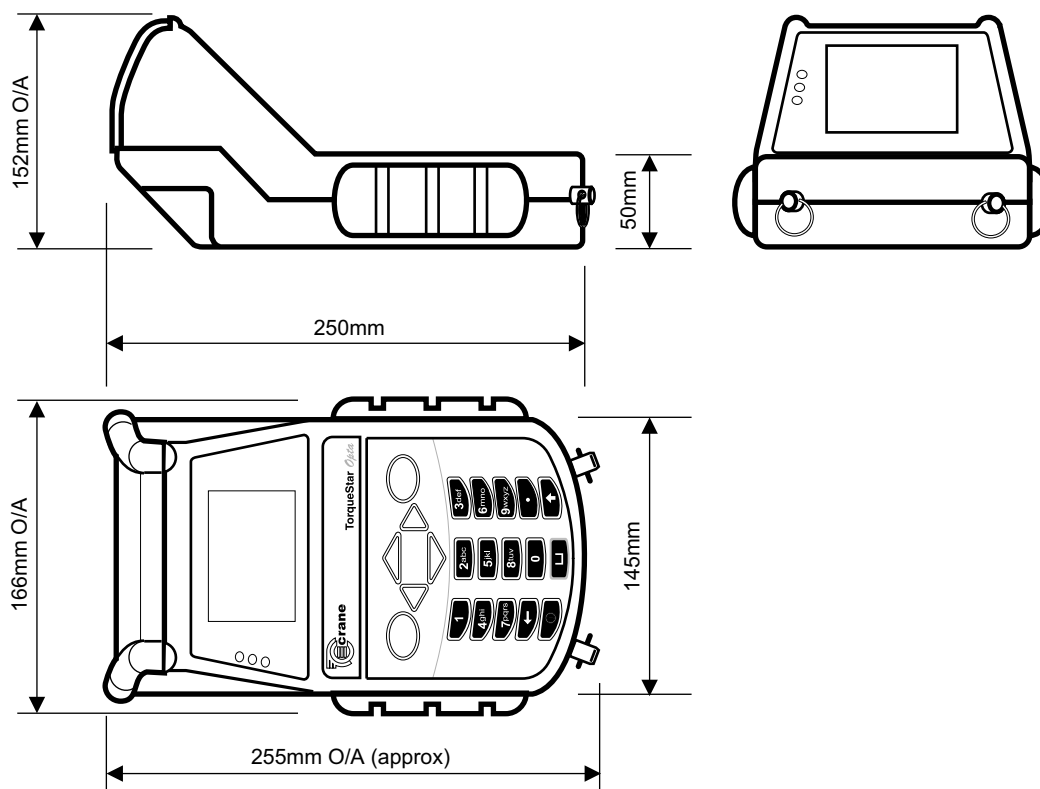
The TorqueStar *Opta* supports the following features:

- Multiple languages
- Track, peak, 1<sup>st</sup> peak (click) and pulse measurement modes
- Torque, angle, pulse count, cycle time and RPM measurement
- Choice of measurement units
- Plug and play with Crane UTA transducers and wrenches
- Compatible with most 3<sup>rd</sup> party transducers and wrenches
- Selectable auto-print of time and date stamped readings
- Optional Storage of time and date stamped readings
- Optional Basic statistics including range, mean, sigma, Cp and CpK
- Optional Storage of Jobs and rounds including readings
- Optional Operator login with Password Protection
- Optional Bar Code Reader Input
- Optional Graphic Display and Printout of Last Rundown Trace
- Optional PC Communications Package
- Force



### FEATURES AND DIMENSIONS

POWER	Rechargeable batteries NiMH		
	Mains powered (needs optional charger)		
WEIGHT	Standard Charge	-	1.480Kg
	Fast Charge	-	1.355Kg
CONSTRUCTION	Ruggedised injection moulding with rubberised bumpers.		
OUTPUT	Serial RS 232 Data		
DIMENSIONS	255mm (L) x 166mm (W) x 152mm (H)		



**SPECIFICATIONS**

<b>Accuracy:</b>	±1% of rated maximum transducer capacity.
<b>Overload Capacity:</b>	110% of stated maximum transducer capacity.
<b>Zero Drift:</b>	<0.1% of rated maximum transducer capacity.
<b>Operating Temperature Range:</b>	+5 to +40 degrees Celsius
<b>Temperature Stability:</b>	±0.1% per degree Celsius.
<b>Sealing:</b>	IP40.
<b>Humidity:</b>	5% to 75% non condensing.
<b>Serial Interface:</b>	9 way female 'D' connector.
<b>Frequency Response:</b>	User selectable in 14 steps from 75Hz to 6144Hz
<b>Calibration:</b>	Issued with calibration certificate traceable to national and international standards. 12 months typical recalibration interval.
<b>Warranty:</b>	12 months parts and labour.
<b>Servicing:</b>	Crane Electronics Ltd offer a full repair facility and calibration to UKAS and international standards.

**MAINS ADAPTOR POWER REQUIREMENTS****Standard Charge**

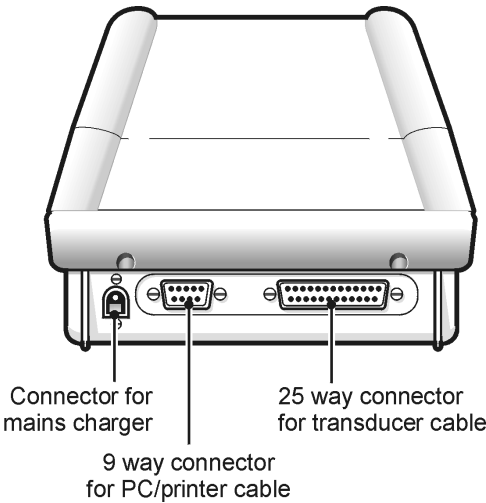
<b>Input:</b>	230V AC   50 Hz   300mA (UK and Euro models)
<b>Input:</b>	115V AC   60 Hz   300mA (US models)
<b>Output:</b>	15V DC   800mA (all models)

**Fast Charge**

<b>Input:</b>	230V AC   50 Hz   700mA (UK and Euro models)
<b>Input:</b>	115V AC   60 Hz   700mA (US models)
<b>Output:</b>	12V DC   >1A (all models)



CONTROLS AND CONNECTIONS



REAR OF UNIT





### OPTA CONTROLS

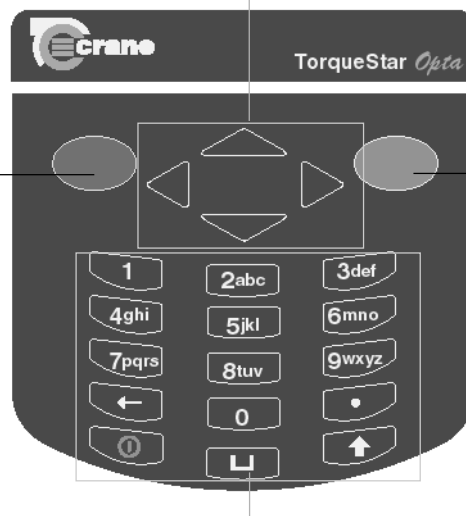
#### Keypad

##### ARROW (CURSOR) KEYS

- used to navigate around the Opta screen and to move between fields for editing etc.

##### RED KEY (CANCEL)

- used for cancelling an option .



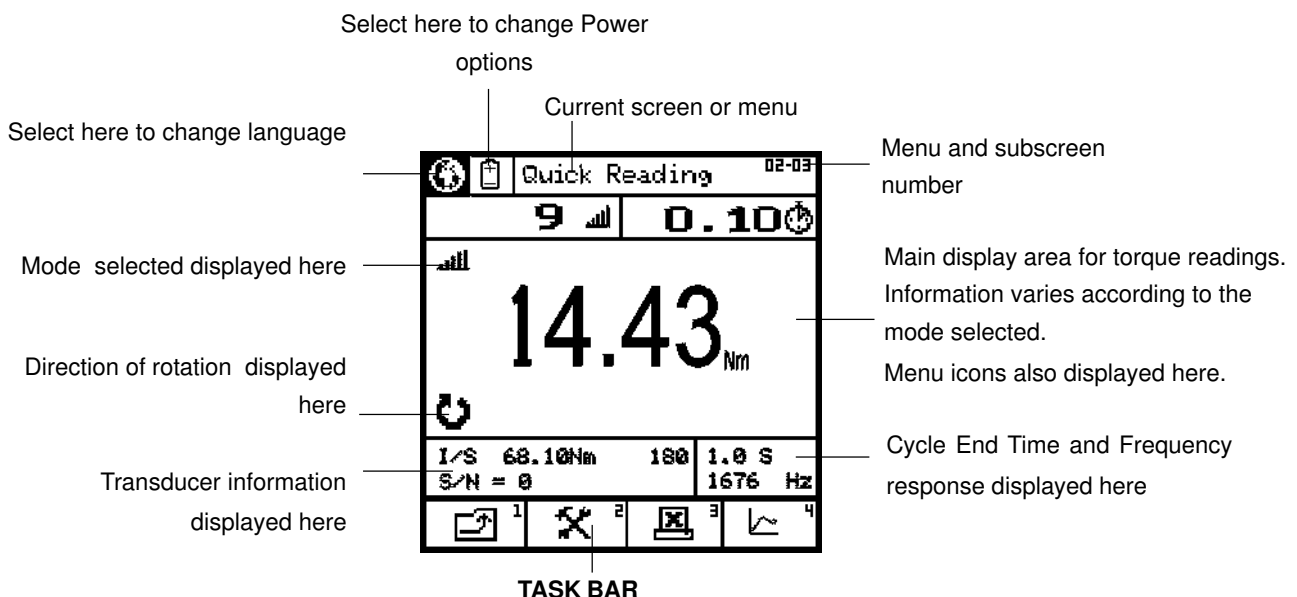
##### GREEN (ENTER) KEY

- used for confirming a selection or accepting an option etc. Similar to the Return key on a computer.

##### ALPHA/NUMERIC KEYS

- used to input numbers or text or to select the numbered functions from the task bar at the bottom of the screen. For text input, the keys work as a mobile phone keypad. Press the key a number of times until the correct character is displayed. I.E. to type the letter C, press key **2abc** 3 times.

#### Screen

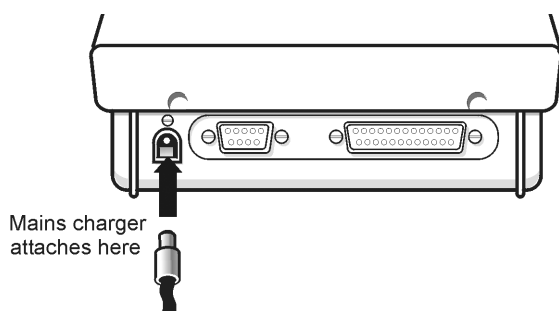




### BATTERY CHARGING

The batteries in the TorqueStar unit are shipped fully charged. In normal use with a transducer connected the batteries have a life of at least 8 hours.

Connect the lead from the Mains adaptor/Charger to the mains connector at the back of the TorqueStar Opta (see below), and connect the mains adaptor to an AC mains supply. The adaptor can be used for direct power from the mains or to charge the internal battery. It has an automatic cut-off to prevent overcharging.



With the unit switched off from a 10% charge state, the batteries will fully discharge in 25-50 days. To prevent the loss of all setup data, the unit has additional battery backup for the internal memory.

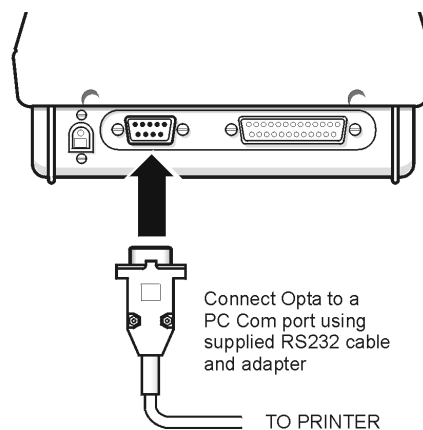
### ATTACHING A PC OR PRINTER

A PC may be connected to the Torquestar Opta using the optional PC connection cable CBL-757-0-0-0-0. Attach one end of the cable to the Torquestar Opta 9 way connector as shown. The other end of the cable connects to the RS 232 COM Port on the PC or the 9 way end of a USB to Serial convertor if one is being used. Do not connect a USB to Serial convertor directly to the Torquestar Opta 9 way connector.

A Serial Printer may be connected to the Torquestar Opta using the optional PC connection cable CBL-757-0-0-0-0 and Serial Printer Adapter CBL-758-01CR-0-0. Attach one end of the cable to the Torquestar Opta 9 way connector as shown. The 25 way end of the Serial Printer Adapter connects to the 25 way Serial connector on the Printer. The printer should be configured to the following settings:-

Baud Rate = 9600  
8 Data Bits  
Stop Bit 1  
No Parity  
Flow Control = None

These are usually factory set as the default settings for the printer. Note: If the printer has an X on/X off feature this will need to be set to ON (usually set via DIP switches on the printer). For further information please refer to the manual which came with your printer.



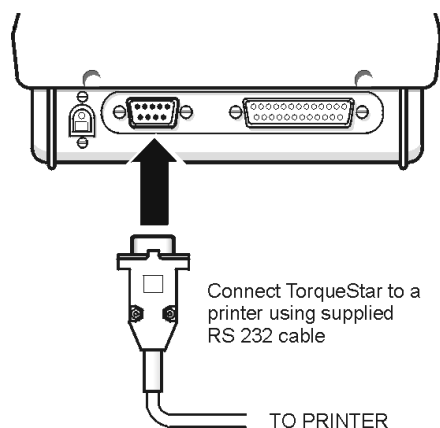
To toggle between Autoprint ON or OFF, select the Autoprint Icon.

- ☒ Autoprint ON
- ☐ Autoprint OFF

### RS 232 TERMINAL EMULATOR


The TorqueStar Opta can be set to automatically send its readout data to a suitable RS 232 Terminal Emulator. To do this, first connect the Opta to the PC Com Port of a Windows Based PC using the PC to TorqueStar Cable, first ensuring that the PC is set-up as per the printer settings opposite. The RS 232 Terminal Emulator will allow date and time stamped torque readings to be displayed or allow the capture of data to a text file for export to other software applications.

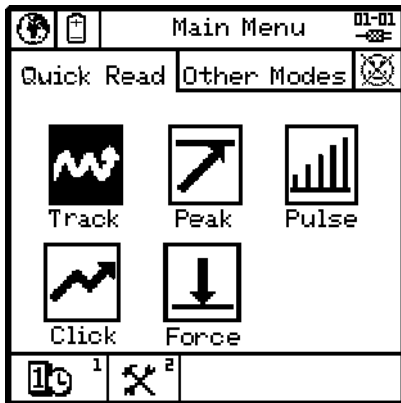
To toggle between sending readings to RS232 Terminal Emulator, or not, select the autoprint Icon as above.






### SWITCHING ON

Press the  ON button on the keypad. The Main Menu screen now appears.



### SWITCHING OFF

From the Main Menu screen select the Power Menu Icon. From within the Power Menu. Select the power off icon  to Switch Off the Opta.

### CHANGING THE POWER SAVE OPTIONS

From the Power Menu, select tools to enter Power save set-up screen.

The user can change the following options:

#### Charger connected

*Auto power off*

*Backlight off*

#### Charger not connected

*Auto power off*




*Backlight off*

Select required Options.

Return to the Power Menu.

Return to the Main Menu.

#### Icons Used in Power Menu

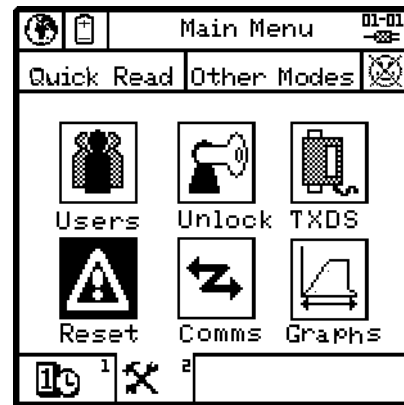
-  Return to previous screen.
-  Tools
-  Switch Off

### COLD RESET

**CAUTION:** THIS FEATURE WILL RESTORE THE OPTA TO ITS INITIAL FACTORY SETTING. USE THIS FEATURE WITH CARE, AS ALL SETTINGS AND DATA WILL BE LOST.

#### To perform a Cold Reset

From the Main Menu, access the Tools screen.



Select the Reset icon.



The following message will appear on the screen;

#### ATTENTION!!!



**ALL DATA, SETTINGS AND UNLOCKED FEATURES WILL BE LOST!**

Return to the previous menu without change or continue with the cold reset

The Opta will prompt; "Are you sure?"

Press  or  ENTER

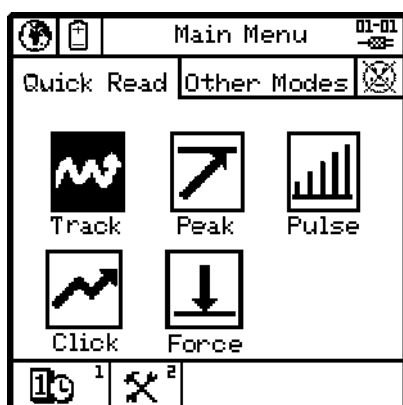
#### Icons used In Cold Reset

-  Return to previous screen.
-  Reset



### MAIN MENU

This is the default screen for the Opta.



From the Main Menu, the user can change the Language of the Opta - see below.

To switch off or change the power settings, see page 11.

To set the time and date, see page 14.

To log in or out as a user, see page 13.

To change the Tools settings, see page 12.

#### Icons used in Main Menu

- Change Language
- Access Power Menu
- User logged in
- No Users logged in
- Time and Date
- Tools

### TO CHANGE THE LANGUAGE

Select the Change Language Icon.

Select the appropriate language from the list .

The Opta will now be operating in the chosen language.

### TO ACCESS OTHER MODES

Select the Other Modes Panel.



Select the required Icon.

The Options are:

**Quick Store** (see page 17)

**Jobs** (see page 21)

**Scan Setup** (see page 27)

**Rounds** (see page 24)

### TOOLS MENU

The Tools Menu gives the user access to the following features:

**USERS** - See page 13

**UNLOCK** - See page 28

**TXDS** (transducer templates) - See page 25

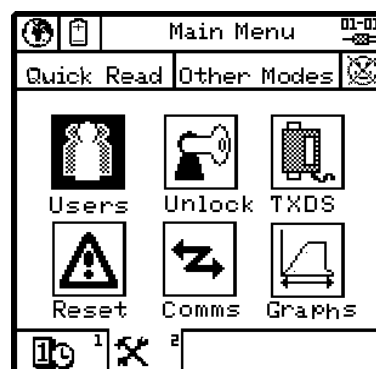
**RESET** (Cold reset) - See page 11

**COMMS** (Communication with a PC) - See page 27

**GRAPHS** - See page 28

Access the tools menu.

The following screen will appear:



Select required Option.

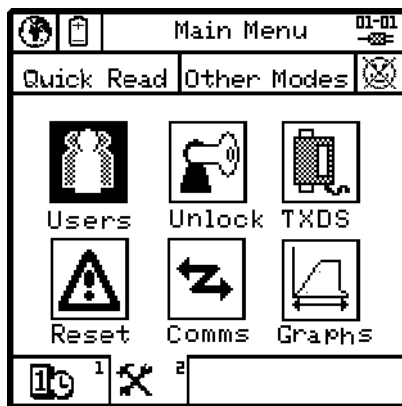


### USERS

The TorqueStar Opta can store up to 10 User names each with a password. Users from this list can log in to the Opta (see page 13).

#### Adding a new user

From the Main Menu screen, select the Tools screen.



Highlight the Users icon .

From the Users screen, select Add User.

Key in the name using the keypad (press each key the required number of times until the correct letter is displayed then pause briefly before moving to the next letter) When the name is correct, press ENTER.

Repeat this process for the required password.

Repeat to add more users as necessary.

When users are present, they can be viewed using the Previous User and Next User functions.

Users can be edited by keying in the amended details as for new users.

Users can be deleted by selecting the Erase User Icon. The screen will then prompt 'delete user?'

Press ENTER to Confirm

#### NOTE:


Only when there are no users, or the first user on the list is logged in, can changes be made to the user list.

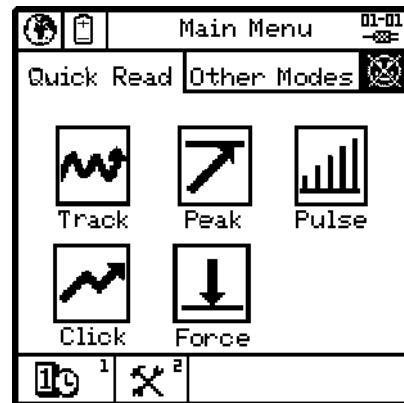
A user must be logged in to record data against Jobs or use the Scan Setup mode.

#### Icons used in the Users Menu

-  Previous user
-  Next user
-  Add user
-  Edit user
-  Erase user

### LOGGING IN

Select the  icon.



The screen will prompt 'Press Enter to log in'.

The screen will display a list of users. Highlight and select the required user.


At the prompt, key in the user's password and ENTER.

**Note:** Text is case sensitive.

The screen will now display the user's name and the log in time and date.

Either move to another screen or select the Logout icon to log out.

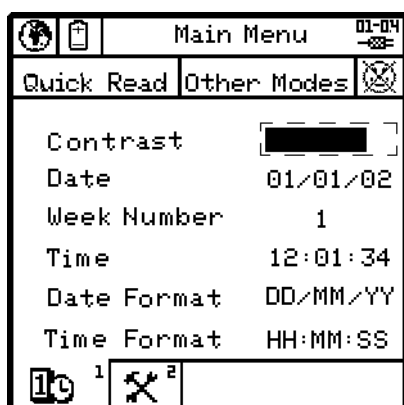
### LOGGING OUT

From the Main Menu, select the  icon. Then select the Logout Icon.



### SETTING THE TIME AND DATE

From the Main Menu, enter the Time and Date setup screen - see below. The screen displays the currently set date, week number, time and the date and time format.



#### To change Screen Contrast:

Select Contrast. Adjust contrast using left and right arrow keys.

#### To change the date:

Select the date. The Date is displayed in editable fields. Enter the required figures using the numbers on the keypad. When date is correct, ENTER to return to the setup screen.

#### To change the time:

Select the time. The time is displayed in editable fields. Enter the required figures using the numbers on the keypad. When the time is correct, ENTER to return to the setup screen.

#### To change the date format:

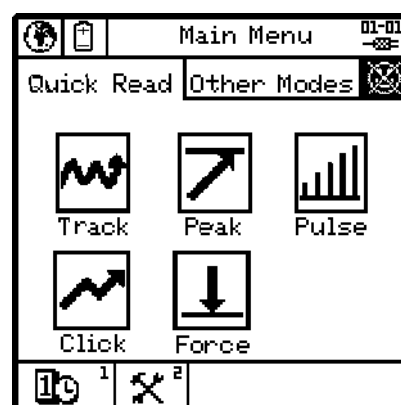
Select the date format. Highlight the required option and ENTER to return to the setup menu.

#### To change the time format:

Select the time format. Highlight the required option and ENTER to return to the setup menu.

### SELECTING THE QUICK READ MODE

From the Main Menu select Quick Read. The available modes are:- Track, Peak, Pulse, Click or Force.



**NOTE:** Before entering the Quick Read Mode, make sure a suitable transducer is connected to the TorqueStar Opta, otherwise an error message will be displayed on the screen. Attach the cable from the transducer to the 25-way D connector on the back of the TorqueStar.

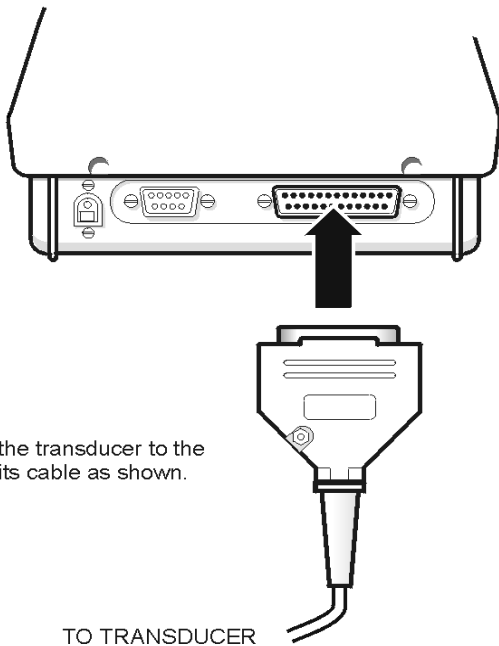
The selected Quick Read Mode screen will now appear. If the transducer connected is not a UTA, the transducer settings must be specified before readings can be taken. In this case, the screen for the transducer settings, will be displayed automatically (see Changing the Settings page 16).

If a UTA transducer is connected, the Opta will automatically recognise the settings.

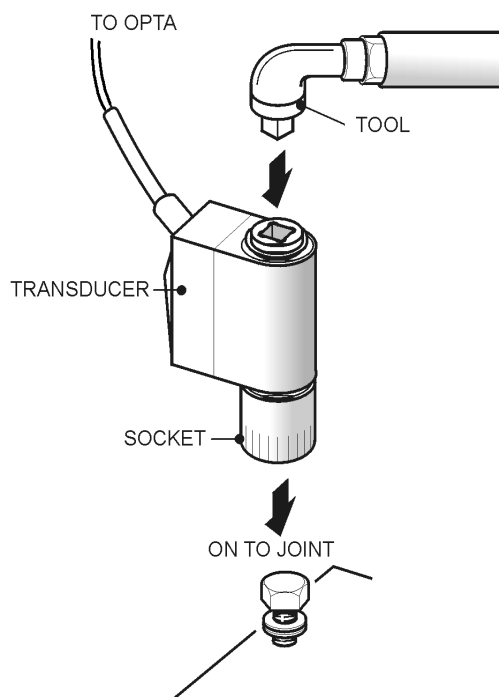


### CONNECTING A TRANSDUCER

Connect a suitable transducer to the TorqueStar Opta via the 25-way D connector at the rear of the TorqueStar as shown. (For DTT - see section 2).

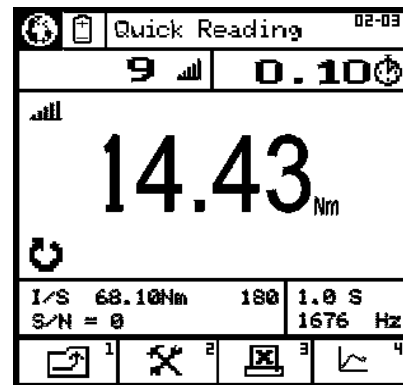


Connect the transducer to the Opta via its cable as shown.



### TAKING A READING (QUICK READ)

With the transducer connected to the TorqueStar Opta, apply torque to the transducer using a suitable tool and observe the reading on the screen.



This example shows a Pulse Mode screen. The display will show the amount of torque applied in the chosen Units of Measure (Nm shown here), the type of transducer and the serial number. The information on the screen will vary according to the type of Measure mode selected. The top of the screen shows the mode selected, as an icon. The direction of the applied torque is shown if applicable, and the number of 'pulses' if in Pulse mode, or angle and rpm if track selected.

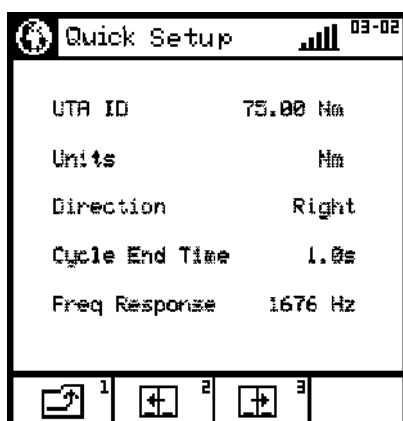
#### Icons used in Quick Read mode

- Change Language
- Access Power Menu
- Return to previous screen.
- Setup - change the setup parameters
- Autoprint ON/OFF
- Plot



### CHANGING THE SETTINGS (QUICK READ)

To change the settings for the chosen Quick Read mode, select the Settings icon



The screen will now display the Settings Menu and the user can change some or all the following:-

**Transducer settings for non UTA only**

**Units of Measurement**

**Direction**

**Cycle End Time**

**Frequency Response**

**Torque Threshold**

**Second Parameter**

**Second Parameter Threshold (if applicable).**

To view additional parameters select previous or next page keys.



The options available will vary according to the chosen measure mode.

**To change the Units of Measurement**, highlight the required Units from the list and ENTER.

**To change the Direction of rotation**, highlight the required Direction (Right, Left or Auto) and ENTER.

**To change the Cycle End Time**, highlight the required figure from the list and ENTER.

**To change the Frequency Response**, highlight the required figure from the list and ENTER.

**To change the Torque Threshold**, key in the required figure (between the max. and min. displayed on screen) and ENTER.

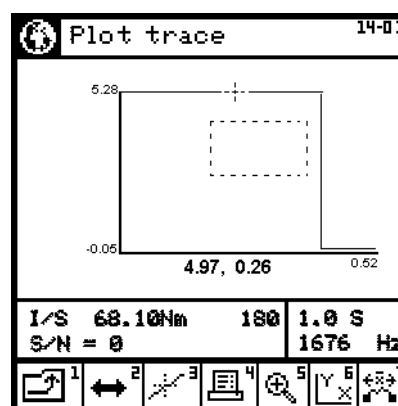
**To change the 2nd Parameter**, choose between *Angle* and *None* and ENTER.

**To change the Angle Threshold**, key in the required figure (between the max. and min. displayed on screen) and ENTER.

#### Icons used In Quick Setup

- Return to previous screen.
- Previous page
- Next page

### PLOT TRACE (LAST READING ONLY)



When zoom is selected, a dotted rectangle (marquee) appears in the display. Use the arrow keys to position the panel over the portion of the plot to be magnified and Zoom In or Zoom out.





From the Select Axis menu the user can select:-

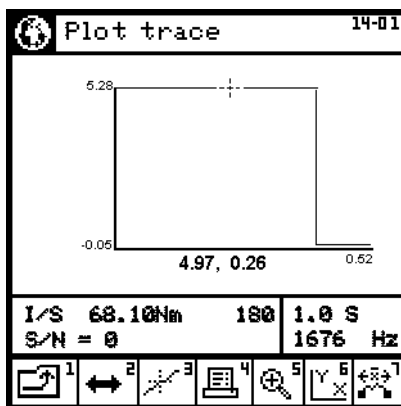
**Torque v Time**

**Secondary (parameter) v Time**

(if secondary param. is available)

**Torque v Secondary (parameter)**

Toggle between highest value or average in between points.

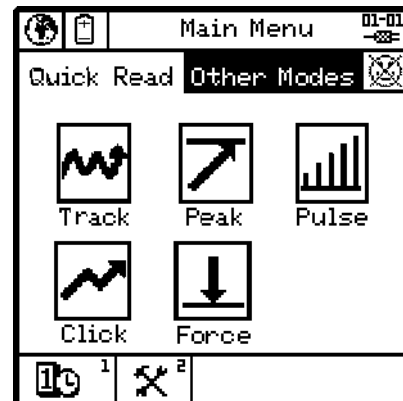


### Icons used in Plot Screen

- |  |   |          |
|--|---|----------|
|  | Fine movement<br>(of cursor/zoom box)   | } Toggle |
|  | Coarse movement<br>(of cursor/zoom box) |          |
|  | Print graph                             |          |
|  | Zoom                                    | } Toggle |
|  | Cursor                                  |          |
|  | Zoom in                                 | } Toggle |
|  | Zoom out                                |          |
|  | Move                                    | } Toggle |
|  | Resize                                  |          |
|  | Change axis                             |          |
|  | Highest value                           | } Toggle |
|  | Average                                 |          |
|  | Scroll graph left                       |          |
|  | Scroll graph right                      |          |

### QUICK STORE MODE

When the TorqueStar Opta is switched on, the default mode is Quick Reading. To access other modes select the Other Modes panel.



A new screen appears. Select the Quick Store icon.



Highlight the Quick Store icon and select.

The available modes are: **Peak**, **Pulse** or **Click**.



**NOTE:** Before entering the QUICK STORE Mode, make sure a suitable transducer is connected to the TorqueStar



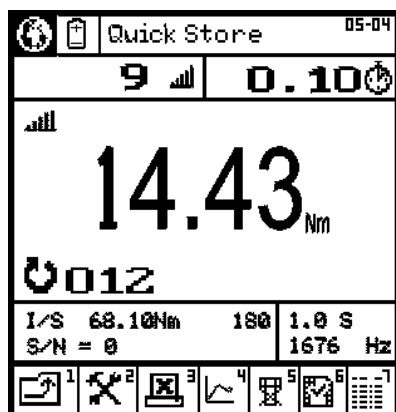
Opta, otherwise an error message will be displayed on the screen. Attach the cable from the transducer to the 25- way D connector on the back of the TorqueStar (see page15).

The selected Quick Store Mode screen will now appear. If the transducer connected is not a UTA, the transducer settings must be specified before readings can be taken. In this case, the screen for the transducer settings, will be displayed automatically (see Changing the Settings page 19).

If a UTA transducer is connected, the Opta will automatically recognise the settings.

### TAKING A READING (QUICK STORE)

With the transducer connected to the Torquestar Opta, apply torque to the transducer using a suitable tool and observe the reading on the screen.



This example shows a Pulse Mode screen. The display will show the amount of torque applied in the chosen Units of Measure (Nm shown here), the type of transducer, the serial number, Cycle End Time and Frequency Response. The information on the screen will vary according to the type of Measure mode selected. The top of the screen shows the mode selected, as an icon. The direction of the applied torque is shown if applicable, and the number of 'pulses' if in Pulse mode.

The top LED will light to show the status of the reading:-

**AMBER** - Measurement is below the preset minimum torque setting. An arrow pointing down will appear on the screen to confirm and the machine will give a single beep.

**GREEN** - Measurement is OK (within the specified torque range) and the machine will give 2 beeps.

**RED** - Measurement is above the preset maximum setting. An arrow pointing up will appear in the display and the machine will give 3 beeps.

Access the Fault Case Indicator screen for a particular reading.

Screen will prompt to 'Select fault'

Options are **No Fault, Stripped Thread, Double Hit, Blind Hole, Crossed Thread, Other Bolt Cause or Operator Error**. Select an option. This option enables user to mark a particular reading to be ignored for the purpose of analysis.

Screen will prompt 'Select Action'.

Options are; **Do Quality Check, Replace Bolt, Report, Investigate or Other Actions**.

### Changing the Autosave option.

In the default mode, with the symbol showing, all readings are saved automatically. Changing the symbol will cause readings to not to be saved unless the ENTER button is pressed. The prompt will now read 'Store Reading'. Pressing ENTER will store, pressing CANCEL will ignore the reading and allow the user to continue. A tick or cross appears on the screen to confirm the action taken.

View the list of the torque readings stored and their status. The display will show the torque and secondary parameter (if any) for the stored readings and their status. See page 20.



### Icons used in the Quick Store mode

- Fault cause indicator
- Auto save ON
- Autosave OFF - press green ENTER button to override
- View readings
- Statistics
- Plot readings
- Print
- Delete
- Include marked readings
- Exclude marked readings
- Toggle Torque/Second parameter
- Scroll Left
- Scroll Right

### CHANGING THE SETTINGS (QUICK STORE)

To change the settings for the chosen Quick Reading mode, select the Settings icon

The screen will now display the Settings Menu and the user can change some or all the following settings:

#### Non UTA Transducer Settings

#### Units of Measurement

#### Direction

#### Cycle End Time

#### Frequency Response

#### Torque Threshold

#### Torque USL

#### Target

#### Torque LSL

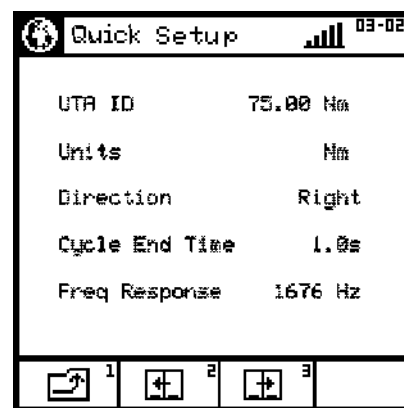
#### Second Parameter

#### Second Parameter Threshold (if applicable).

#### Second Parameter USL

#### Second Parameter Target

#### Second Parameter LSL



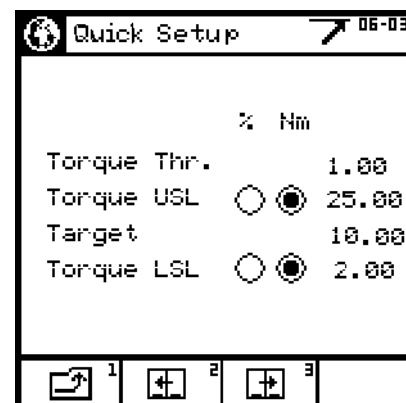
The options available will vary according to the chosen measure mode.

**To change the Units of Measurement**, highlight the required Units from the list and ENTER.

**To change the Direction of rotation**, highlight the required Direction (Right, Left or Auto) and ENTER.

**To change the Cycle End Time**, highlight the required figure from the list and ENTER.

**To change the Frequency Response**, highlight the required figure from the list and ENTER.





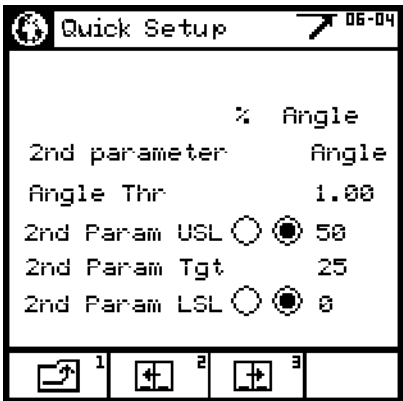
**To change the Torque Threshold**, key in the required figure (between the max. and min. displayed on screen) and ENTER.

**To change the Torque USL (Upper Specification Limit)**, key in the required figure (between the max. and min. displayed on screen) and ENTER.

**NOTE:** The Torque USL and LSL can be displayed as either a figure in the chosen Units of Measurement or as a percentage of the USL. To change, highlight the desired option (radio button) and ENTER.

**To change the Target Torque**, key in the required figure (between the max. and min. displayed on screen) and ENTER.

**To change the Torque LSL (Lower Specification Limit)**, key in the required figure (between the max. and min. displayed on screen) and ENTER.



**To change the 2nd Parameter**, choose between *Angle* and *None*, and *Pulse Count* (for *Pulse measurements only*) and ENTER.

**To change the Angle Threshold**, key in the required figure (between the max. and min. displayed on screen) and ENTER.

**To change the 2nd Param. USL (Upper Specification Limit)**, key in the required figure (between the max. and min. displayed on screen) and ENTER.

**NOTE:** The Second Param. USL and LSL can be displayed as either an angle or as a percentage of the USL. To change, highlight the desired option (radio button) and ENTER.

**To change the 2nd Param. Target**, key in the required figure

(between the max. and min. displayed on screen) and ENTER.

**To change the 2nd Param. LSL (Lower Specification Limit)**, key in the required figure (between the max. and min. displayed on screen) and ENTER.

**VIEW READINGS (QUICK STORE)**

From the Quick Store mode select View readings.

A list of the current readings will appear in a similar format to the one shown below.

View Readings			
#	Torque Nm		Angle
001	10.05 OK		0.0 OK
002	10.04 OK		0.0 OK
003	10.11 OK		0.0 OK
004	20.01 HI		0.0 OK
005	20.05 HI		0.0 OK
006	8.50 OK		0.0 OK
007	10.11 OK		0.0 OK
008	3.11 LO		0.0 OK
009	10.12 OK		0.0 OK

This will show the number of each reading, the torque value in the chosen Units of Measurement, the angle (if applicable) and the status of the reading (**Hi**, **LO** or **OK**). Scroll down the readings to access any not able to fit on to the screen. Scroll left and right to view their values.

**Options Available:**

View the statistics for the list. See View Statistics. Page 21

See a plot of the readings. See Plot Readings. Page 21

Print the list.

Erase the list, the screen will prompt '*Erase all readings?*'

To return to the readings without erasing, CANCEL.



### VIEW STATISTICS

The View Statistics screen shows the following information for the last group of readings taken:

- X - (x-Bar) - for both Torque and Angle (if applicable)
- R - for both Torque and Angle (if applicable)
- s - (sigma) - for both Torque and Angle (if applicable)

To change the size of the samples from which the statistics are based, highlight and select the figure Key in the required number (between 0 and 200) and ENTER.

**Note:** Entering a figure of 0 will base the statistics over all readings.

Select Option to include readings marked for a fault and again to exclude them.

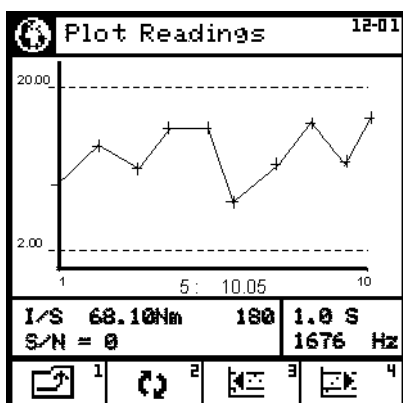
### PLOT READINGS

From the Quick Store mode select View readings.

From the View Readings screen, select Plot the Readings.

The Plot Readings screen will appear showing the plot and the Upper and lower limits.

Scroll the plot to the right to view any points not able to fit on to the screen **or** Scroll to the left.



Select Icon to toggle between Torque and Second Parameter if selected.

### JOBS

**NOTE:** A user must be logged in before any Job can be performed.

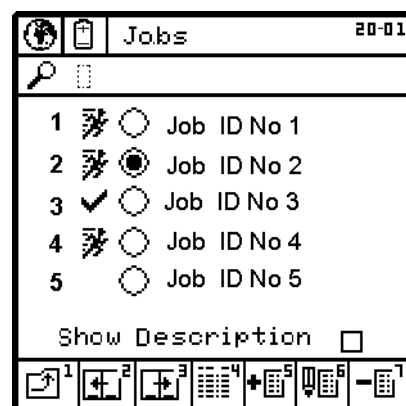
The TorqueStar Opta can store a number of jobs consisting of 1 - 50 Subgroups, each containing up to 1 - 30 samples. These are stored with an optional user's comment for subsequent sequences of readings.

#### To access the Jobs mode

From the Main menu - Other Modes screen, select the Jobs icon.



The Jobs screen will appear.



The list shows up to 5 jobs per screen up to a maximum of 275 jobs.

**NOTE:** If the **Show Description** box is checked select and each page will show a single Job plus the description. Select the box again to clear and return to normal listing.



### Options Available

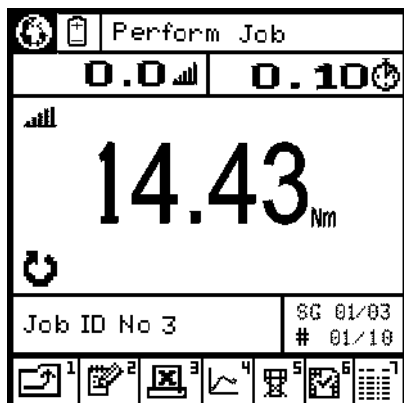
View readings (see page 22).

Add a new Job (see page 23).

Edit a Job



Delete a job

Select the required job. The Perform Job screen will now appear ready to accept a series of readings. This is similar to the Quick Store screen with the addition of the Job name, the subgroup number, and an additional option for adding a comment to jobs and subgroups.



As the readings are taken, the number of readings will be counted until the target figure is reached. The number of subgroups within the job will also be counted. The Opta beeps twice after each reading and 3 times when the end of each group has been counted.

The following icons appearing next to Jobs in the list indicate the following:

-  = job in progress.
-  = job has been completed.

### Options Available

Add a comment to the job.

Toggle sending data to the printer (see page 10)

View the plot trace (see page 16)

Access the Reading Status screen for a particular reading.

Screen will prompt to 'Select fault'

Options are **No Fault, Stripped Thread, Double Hit, Blind Hole, Crossed Thread, Other Bolt Cause or Operator Error**. Select an option. This option enables user to mark a particular reading to be ignored for the purpose of analysis. Screen will prompt 'Select Action'.

Options are; **Do Quality Check, Replace Bolt, Report, Investigate** or **Other Actions**.

### Change the Autostore option.

In the default mode, with the symbol showing, all readings are saved automatically. Changing the symbol will cause readings not to be saved unless the ENTER button is pressed. The prompt will now read 'Store Reading'. Pressing the ENTER button will store. Pressing the CANCEL button will ignore the reading and allow the user to continue.

A tick or cross appears on the screen to confirm the action taken.

View a list of the torque readings stored and their status.

The display will show the torque and secondary parameter (if any) for the stored readings and their status.

View the statistics for the list of readings.

In the Statistics display toggle between including or excluding any readings marked for faults as described.

Show a plot for the readings. See page 21.

## VIEW READINGS (JOBS)

From Jobs mode select View Readings.

A list of the current readings will appear in a similar format to the one shown in Quick Store, with the addition of the Subgroup number, the date and time, the transducer serial number and the Job name.

Scroll down the readings to access any not able to fit on to the screen. Scroll left and right to view their values.



### Options Available

View the statistics for the list. See View Statistics page 21.

See a plot of the readings. See Plot Readings page 21.

Print the list.

Erase the list. The screen will prompt '*Erase all readings?*'

To return to the readings without erasing CANCEL.

### ADDING NEW JOBS TO LIST

Select add a new job.

Key in required Job name and ENTER.

Screen will prompt '*Key in job description*', ENTER.

Key in the job description and ENTER.

To edit the transducer settings enter the Transducer Template screen. Select a transducer from the list (options are Auto ID or 9 user editable options (to change these, see page 25).

The following parameters can be set in the Jobs Mode:

**Job Name**

**Job description**

**Number of samples**

**Number of subgroups**

**Measure Mode**

**Job Comment**

**Comment length**

**Reference length**

**Edit transducer details**

**Span**

**Units of Measurement**

**Pulse per Rev**

**Direction**

**Cycle End Time**

**Frequency Response**

**Torque Threshold**

**Torque USL**

**Target**

**Torque LSL**

**Second Parameter**

**Second Parameter Threshold (if applicable).**

**Second Parameter USL**

**Second Parameter Target**

**Second Parameter LSL**

The Job setup parameters are stored over several pages.

To access these move to the next page or move to the previous page.

Altering these parameters is similar to the setup in the Quick Store Mode.

To edit the number of samples to be taken, select Samples and key in the required figure (between the minimum and maximum shown on screen).

To edit the number of subgroups to be taken, select Samples and key in the required figure (between the minimum and maximum shown on screen).

**To change the Units of Measurement**, select the required Units from the list.

**To change the Direction of rotation**, select the required Direction (Right, Left or Auto) .

**To change the Cycle End Time**, select the required figure from the list.

**To change the Frequency Response**, select the required figure from the list.

Job Setup		27-05
Transducer	[I/S]	
Span	50.00	
Transd. Units	Nm	
Pulses per Rev	0	
Millivolts/Volts	2.00	
Bridge Res.	350	

Navigation icons: 1 (Back), 2 (Forward), 3 (Home), 4 (Exit)

**To change the Torque Threshold**, key in the required figure (between the max. and min. displayed on screen).

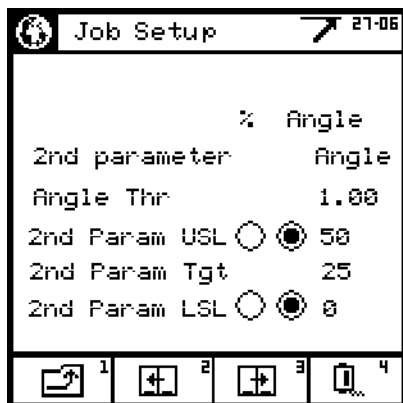
**To change the Torque USL (Upper Specification Limit)**, key in the required figure (between the max. and min. displayed on screen).

**NOTE:** The Torque USL and LSL can be displayed as either a figure in the chosen Units of Measurement or as a percentage of the USL. To change, select the desired option (radio button).

**To change the Target Torque**, key in the required figure (between the max. and min. displayed on screen).



**To change the Torque LSL (Lower Specification Limit),** key in the required figure (between the max. and min. displayed on screen).



**To change the 2nd Parameter,** choose between *Angle*, *Pulse* and *None*.

**To change the Angle Threshold,** key in the required figure (between the max. and min. displayed on screen).

**To change the 2nd Param. USL (Upper Specification Limit),** key in the required figure (between the max. and min. displayed on screen).

**NOTE:** The Second Param.USL and LSL can be displayed as either an angle or as a percentage of the USL. To change, select the desired option (radio button).

**To change the 2nd Param.Target,** key in the required figure (between the max. and min. displayed on screen).

**To change the 2nd Param. LSL (Lower Specification Limit),** key in the required figure (between the max. and min. displayed on screen).

Check boxes next to Job Comment, Comment and Reference can be used to ensure the user is prompted to enter comments at the appropriate time.

### Icons used in the Jobs Menu

- Add comment
- Job in progress
- Job completed
- Add job
- Edit job
- Delete job
- Select transducer

## ROUNDS

**NOTE:** A user must be logged in before any Round can be performed.

A round is a series of Jobs to be performed together as a group. Each round must contain at least 2 Jobs.

### To access the Rounds mode

From the Main menu - Other Modes screen, select the Rounds icon. The Rounds screen will appear.



The list shows up to 5 rounds per screen.

**Note:** If the *Show Description* box is checked each page will show a single Round plus the description. Select the box again to clear.

Select the required round. The Perform Job screen will now appear ready to accept a series of readings for the first Job in the Round. This is the same screen as in the Jobs mode.

As the user takes readings, the Opta will count down each Job subgroup showing the name of the Job (see Jobs Mode page 21) until all of the Jobs in the Round are complete. The Opta screen will now return to the Rounds List.

Select another round to perform or return to the Other Modes Menu.





### Options Available



Add a new Round

Edit a Round










Delete a Round

**Note:** rounds completed or in progress cannot be deleted or edited.

The following icons will appear next to the the Round number to indicate the status of the Round.

-  = Round in progress.
-  = Round has been completed.

#### Icons used in the Rounds Menu

-  Job in progress
-  Job completed
-  Return to previous screen.
-  Previous page
-  Next page
-  View Round
-  Add Round
-  Edit Round
-  Delete Round

### ADDING NEW ROUNDS TO LIST

To add a new round

Key in the name for the round at the prompt and ENTER.  
Select the description field.

Use the alpha-numeric keys to enter the round description and ENTER.

Select the Sampling field.

Select the required sampling option from the list .

Options are; ***In any order, Vertical, Horizontal, Vert. plus prompt, Horiz. plus prompt.***

To add a Job to the Round.

Select add a new Job.

Select the required job from the list.










Continue this process until you have selected all the required jobs for the round.

To save the round.

Opta will prompt 'Add round to list?'

ENTER to accept or CANCEL to skip without saving.

#### Icons used in the Rounds Setup

-  Return to previous screen.
-  Previous page
-  Next page
-  Edit Round
-  Add Job
-  Edit Job
-  Move job up list
-  Move job down list
-  Delete Job

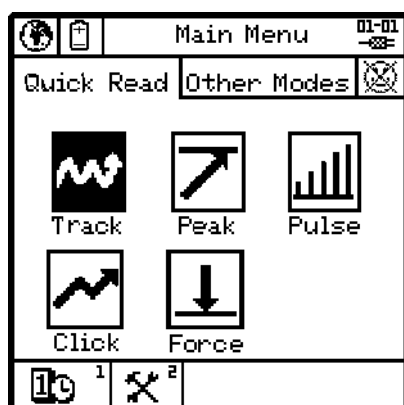
### TRANSDUCER TEMPLATES

The TorqueStar Opta has 9 preset transducer templates which are editable by the user. This can be selected by the user in Jobs mode if the transducer is non UTA and therefore not recognised by the Opta.

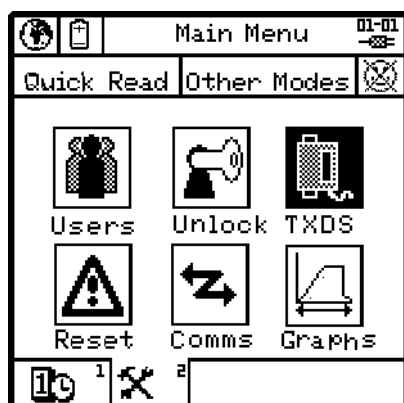


### To edit the Transducer Templates.

From the Main Menu access the Tools screen

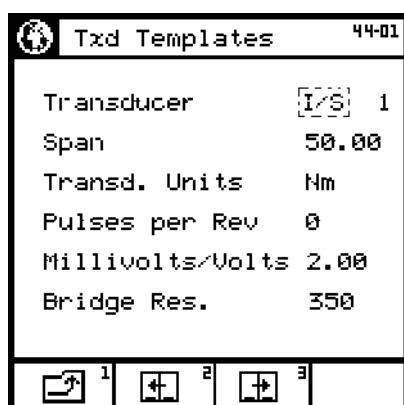


From the Tools Screen, select the TXDs Icon.



The options available will depend on the type of transducer selected.

From the TXD Templates screen select the option(s) to be altered and edit .



**To change the transducer type**, select the required Transducer Type (UTA, I/S or H/O). To return to the Txd Templates screen without change CANCEL.

**To Change the Span**, key in the required figure (between the max. and min. displayed on screen) and ENTER. To return to the Txd Templates screen without change CANCEL.

**To change the Transducer Units of Measure**, select the required option from the list. To return to the Txd Templates screen without change CANCEL.




**To change the Pulses per Rev**, key in the required figure (between the max. and min. displayed on screen) . To return to the Txd Templates screen without change CANCEL.

**To change the Millivolts/Volts**, key in the required figure (between the max. and min. displayed on screen). To return to the Txd Templates screen without change CANCEL.

**To change the Bridge Resistance**, key in the required figure (between the max. and min. displayed on screen). To return to the Txd Templates screen without change CANCEL.

The figure to the right of the Transducer type indicates the transducer setup (1-9).

#### Icons used In Transducer Setup

-  Return to previous screen.
-  Previous transducer
-  Next transducer

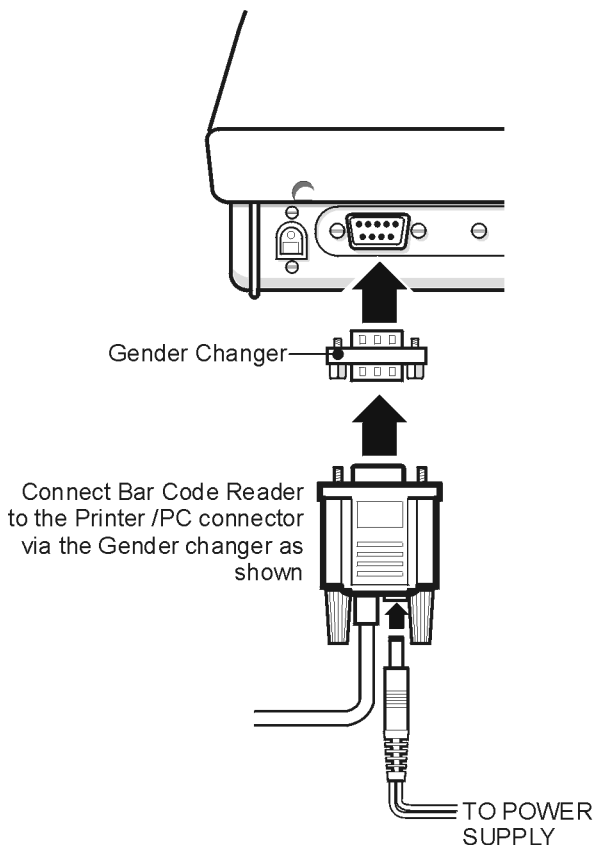


### USING A BAR CODE READER

A Bar Code Reader can be used to input barcoded numbers into the Opta. Crane recommends using a PSC QS 6000 Plus handheld laser scanner with RS232 output and individual power supply suitable for code 39 or 3 of 9. For use of other bar code readers, please refer to Crane Electronics Ltd.

In Quick Store mode, barcode input is available for Industry Standard transducer serial numbers.

#### Connecting the Bar Code Reader



Connect the Bar Code Reader to the Printer/PC connector at the rear of the Opta.

**NOTE:** for additional information, please refer to the documentation which came with your scanner.

#### Before First Use:

The scanner must be setup by scanning the three codes on page 28.

Certain text fields on the TorqueStar Opta will allow the input of barcode data.

We recommend the data is only scanned once, and the green ENTER key is pressed to verify the data is correct.

#### Jobs Mode

Barcode input is available for Industry Standard (IS) serial number. Additionally, Barcode input is available in the following modes:

- Job Name
- Description
- Search Field
- Subgroup Comment
- Subgroup Reference

#### Rounds Mode

- Create Round Name
- Description
- Search Field



**BAR CODE READER INITIAL SETUP**

These bar codes must be scanned in this order to initialise the reader before first use.

SET -----



DISABLE LABEL I.D. CONTROL -----



END -----



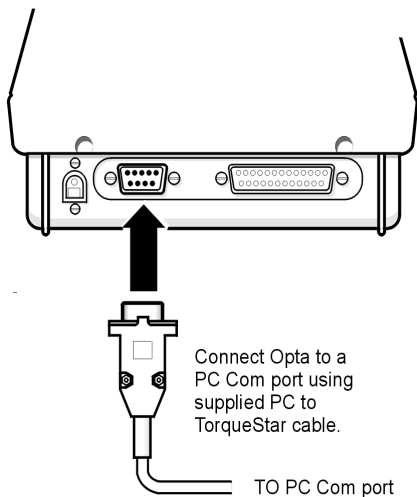


### COMMUNICATIONS

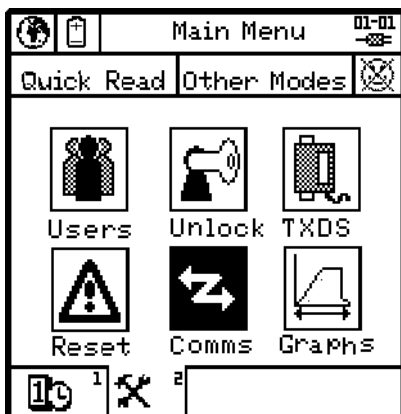
The Opta can be connected to a Windows based PC to upload and download data using the Opta Comms software available from Crane.

#### Connecting to a PC

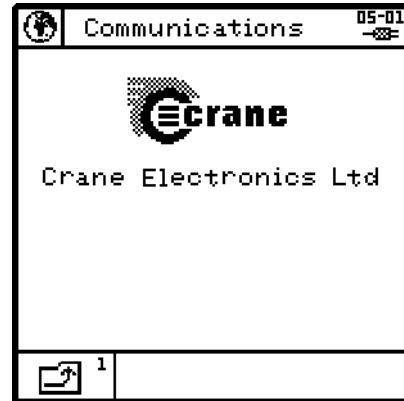
Using the PC to Torquestar cable, connect the Opta to the PC COM port .



To activate Comms mode, from the Main Menu select Tools. Select the Comms icon.



The display will now show the communications screen.

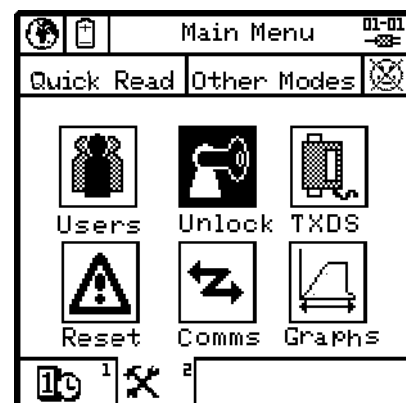


For Information on using Opta Comms software, see the Opta Comms Manual.

### UNLOCK FEATURE

Each Opta is supplied with a Certificate of Authenticity which shows a software activation code (4 blocks of 4 digits) and a list of the features available to the machine.





If the Opta has been reset, the code will have to be re-activated to unlock the Opta and allow it to use all its features. To unlock the Opta, from the main menu select the Tools menu.



Select the Unlock icon.

The activation code will appear on the screen with an arrow below the first digit.



Use the  and  keys to move the arrow across all of the digits in turn, and the  and  arrow to cycle through the alpha numeric characters to input the correct digits until the code displayed is the same as the one on the certificate.

### Options available:

Activate the Unlock Code.

The software is now unlocked. Features marked with a tick are available to the user.

List Features

Return to Previous Screen

### NOTE :

Any items not ticked in the list may be encountered during operating the Opta as greyed out items. When attempts are made to access these icons, an alert message will appear advising the user that this item is currently unavailable. It is possible for the user to upgrade to include these options by contacting Crane Electronics Ltd. An update activation code can be supplied to enable the user to access these features without the need to return the Opta to the factory.

#### Icons used in the Unlock screen



Return to previous screen.



Activate unlock code



List features

## GRAPHS

TorqueStar Opta allows the selection of the maximum duration of the Trace function.

Select the time required to suit your application.



### GLOSSARY OF TERMS

#### Cp

This is a capability index which shows the process capability potential but takes no account of how centred the process is. This is used for capability studies and Cp may range in value from 0 to infinity. A large value indicates greater potential capability and a value of 1.33 or greater is desirable.

$$C_p = \frac{\text{Max} - \text{Min}}{6 s}$$

(Max and Min are limit values)

#### CpK

This is an index which indicates whether the process will produce units within the tolerance limits. If the process is centred on the nominal value then CpK will have a value equal to Cp. For values of CpK between 0 and 1 then some of the 6 sigma spread will fall outside tolerance limits but for values greater than 1 these will all be within tolerance. A negative value of CpK indicates that the process mean is outside tolerance limits. A value of 1.33 or greater is desirable.

$$C_{pK} = \text{lesser of } \frac{(\text{Max} - x^-)}{3 s} \text{ or } \frac{(x^- - \text{Min})}{3 s}$$

(Max and Min are limit values)

#### CAM

This is an alternative capability index requiring a minimum of 30 readings to be taken. In this implementation, 5 sub-groups of 6 samples are used for each calculation. The CAM calculation uses the following formula:

$$\frac{\text{Max} - \text{Min} \times \text{Cam Factor}^*}{6 \times \text{Average Sample Value}}$$

\* CAM Factor is taken from a table (in the case of 5 x 6 samples = 1.910)

#### High Output

Torque transducer with no coding links but internal pre-amplifier Transducer (H/O) giving an output signal level of typically 1 or 2 volts.

#### Horizontal

Collection of data by round, taking one reading for each sampling Job in turn.

#### Industry Standard Transducer (I/S)

Type of transducer, with no pre-amplifier or coding links, but with the exact rated torque, marked on the body.

#### Job

Specification of one particular torque value to be collected. Each Job has a name of up to 14 characters, 8 if downloaded from a PC. TorqueStar Opta can store up to 275 different Jobs at any one time.

#### Master Round

A sequence of up to five rounds. It is used to allow a collection sequence, which is part vertical, part horizontal.

#### Max Torque Value

Upper tolerance level of any reading. This can equal but not exceed the torque rating of the transducer to be used.

#### Min Torque Value

Lower tolerance level of any reading.

#### No. of Sub Groups

Number used to allocate memory space in TorqueStar Opta, for a particular Job. May be set in the range of 1 to 50.

#### Round

A sequence of Jobs to be collected either horizontally or vertically. Each round has a name of up to 14 characters, 8 if downloaded from the PC.

#### Sample

Individual torque reading.



### Standard Deviation $\sigma$

Is a measure of the variation of the samples of a statistical group.

If a group of  $n$  values has a mean of  $\bar{x}$  then its standard deviation is given by;

$$\sigma = \sqrt{\frac{\sum_{i=1}^N (x_i - \bar{x})^2}{n - 1}}$$

### Sub - Group

Grouping of samples to enable analysis, with an allowable range of 1 - 50.

### Threshold Torque Value

Level of torque, which a signal must rise above and then fall below, to be considered a valid torque cycle. This may be set in the range of 1 to 50% of rated span or the Min Torque Value, whichever is the lower.

### Units of Measure

It is possible with TorqueStar Opta to read a transducer calibrated in say Nm, and convert internally to display and store in any of the other torque units.

### UTA Tx

Family of torque transducers which TorqueStar Opta can identify by coding links.

### UTA Tx ID

Specification of transducer by rating in preselected units. Used as an identity or 'name'.

### Vertical

Collection of data by round, where a full sub-group is collected for a characteristic, before stepping to the next Job.

### Vertical plus Prompt

Identical in procedure to that of Vertical mode except that before stepping to the next characteristic, TorqueStar will prompt for the fitting of a transducer (even though the correct one is installed) and will require the ENTER key to be pressed.





### OVERVIEW - DTT OPTA

DTT *Opta* introduces a world of choice, features and flexibility to the tool test environment, with interchangeable transducer modules, built-in printer option, and software features tailored to the application requirement.

These options allow DTT *Opta* to be configured to closely match the user requirements, and a selection of transducer modules can be made available to the operator to cover a broad torque range. Different transducer modules are available with the transducer axis in either the vertical or horizontal plane.

In common with the *Opta* product family, DTT *Opta*'s range of software features can be individually specified giving variations from a simple no-frills readout to a comprehensive audit tool with display of torque curves and specialist measurement routines. As the software is common throughout the *Opta* product family, users familiar with TorqueStar *Opta* will already know how to use DTT *Opta*, and vice-versa.

### PACKING LIST

The following items are supplied with the DTT *Opta* unit.

1 x DTT <i>Opta</i>	1 x Transducer	1 x User Manual (this book)
1 x Quick start guide	1 x Mains adaptor/charger	1 x Menu Navigation Guide

Please check these items are all present and notify Crane immediately of any shortages.

### CARE & STORAGE

This unit is designed for indoor use only

Operating temperature range      5-40 degrees C

Storage temperature range      0-50 degrees C

The membrane keypad may be wiped clean with a soft damp cloth. The unit is not waterproofed and spillages should be avoided.

THIS UNIT CONTAINS NO USER SERVICEABLE PARTS. ONLY QUALIFIED SERVICE PERSONNEL SHOULD REPLACE OR FIT PARTS.

### BATTERIES

The battery in the DTT *Opta* is a NiMH (Nickel Metal Hydride).

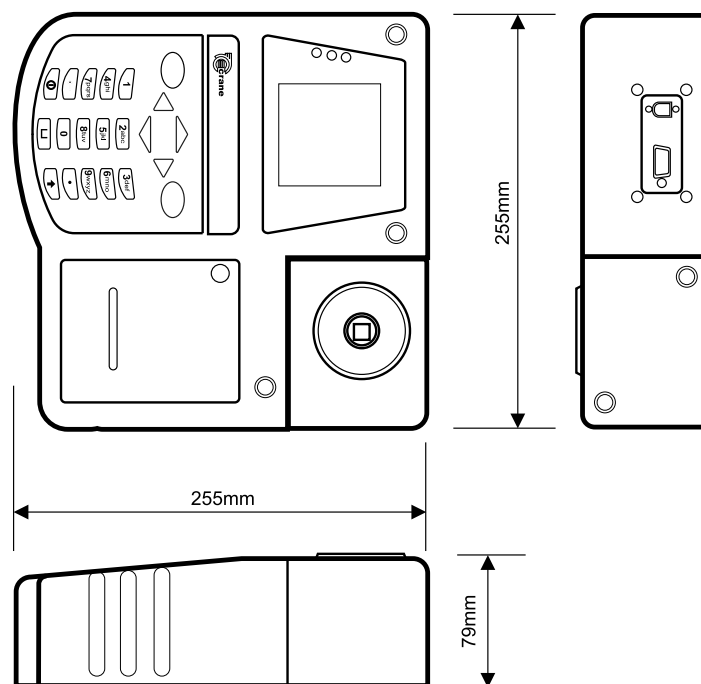
From fully discharged, the unit will require a 16 hour charge for normal use.

When the mains adaptor is plugged into the socket and switched on at the mains, the **red** LED will come on to indicate the DTT *Opta* is charging correctly.



### FEATURES AND DIMENSIONS

<b>POWER</b>	Rechargeable batteries NiMH	
	Mains powered (needs optional charger)	
<b>WEIGHT</b>	Main Unit	3.5 Kg (without transducer and printer)
	Transducer Module	1.3 Kg
	Printer Module	0.22 Kg
<b>DIMENSIONS</b>	Overall	255mm (L) x 255mm (W) x 79mm (H)
	Transducer	105 mm (L) x 85 mm (W) x 79 mm (H)
Bottle top or adjustable component fixture: 10 - 130 mm (max gripping dimensions)		



### SPECIFICATIONS

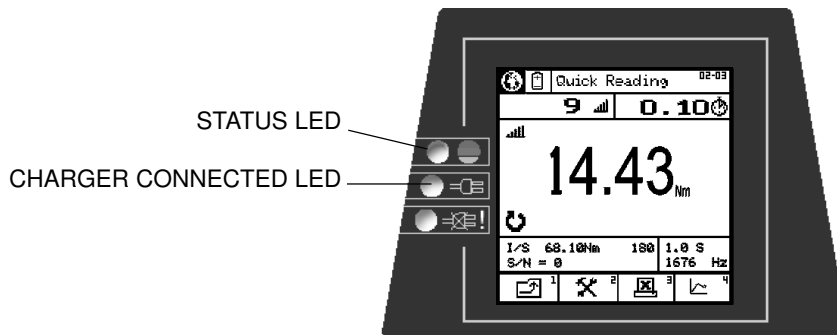
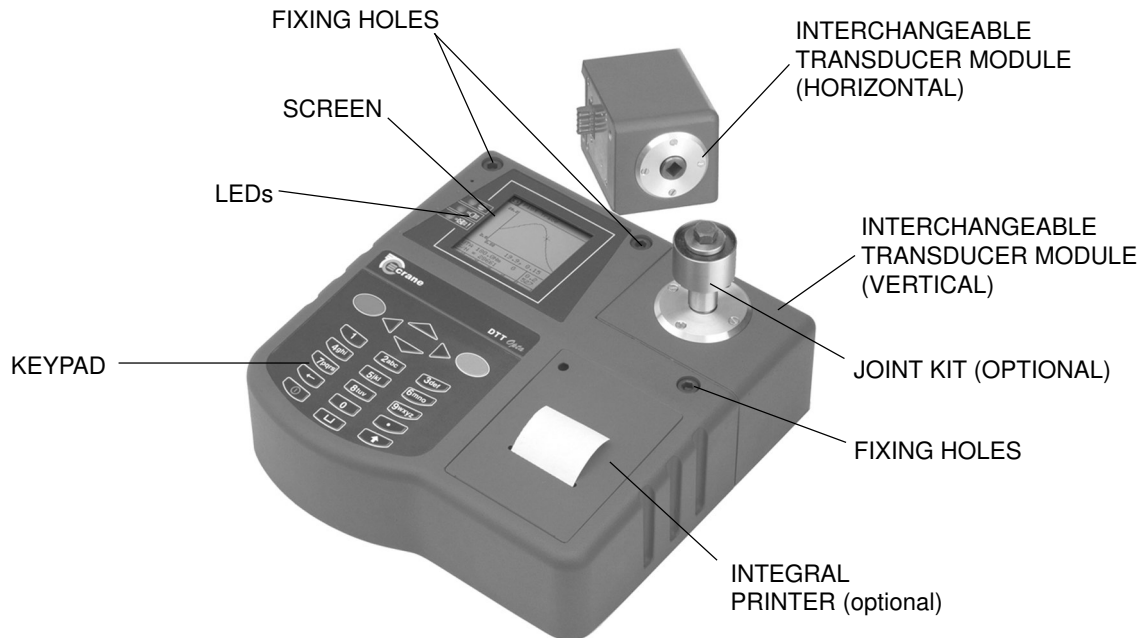
#### MAINS ADAPTOR POWER REQUIREMENTS

**Input:** 230v AC 50HZ 700mA (UK and Euro models)

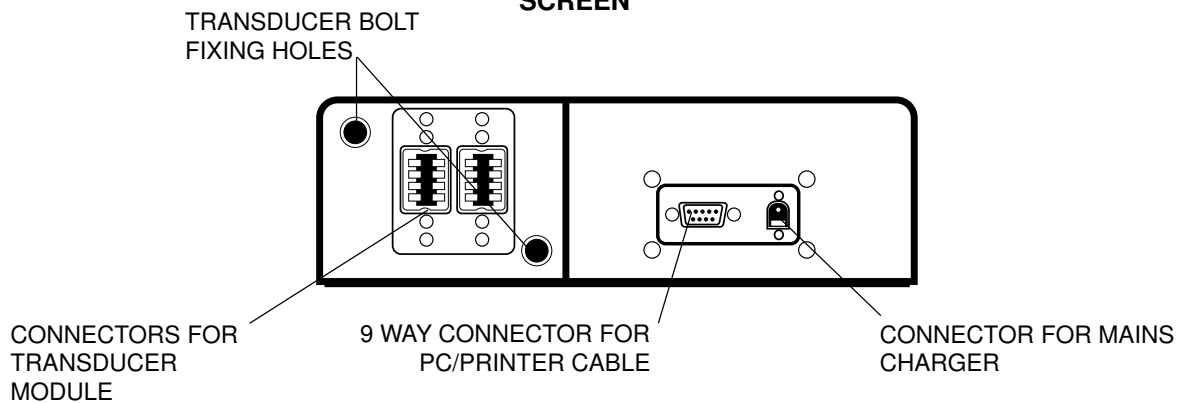
**Input:** 115v AC 60HZ 700mA (US models)



### CONTROLS AND CONNECTIONS



SCREEN

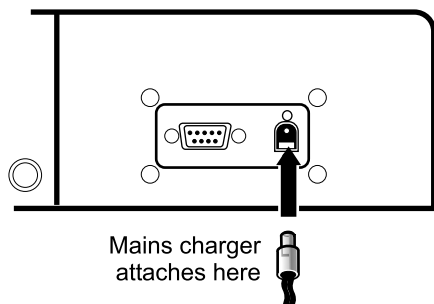


REAR OF UNIT

### BATTERY CHARGING

The batteries in the DTT Opta unit are shipped fully charged. In normal use with a transducer connected the batteries have a life of at least 8 hours.

Connect the lead from the Mains adaptor/Charger to the mains connector at the back of the DTT Opta (see below), and connect the mains adaptor to an AC mains supply. The adaptor can be used for direct power from the mains or to charge the internal battery. It has an automatic cut-off to prevent overcharging.







With the unit switched off from a 10% charge state, the batteries will fully discharge in 25-50 days. To prevent the loss of all setup data, the unit has additional battery backup for the internal memory.

### PRINTING

#### Printing







The DTT Opta can be set to automatically send its readout data to a serial printer or the unit's optional integral printer.

Press **3<sup>def</sup>** to toggle between Integral printer  and external printer .

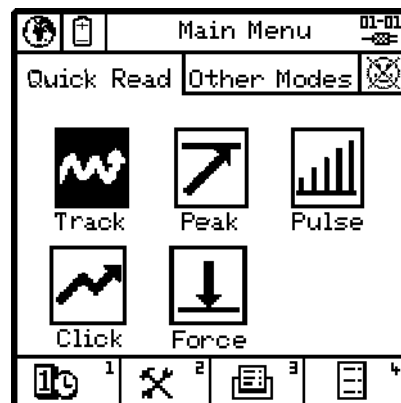
Press **4<sup>ghi</sup>** to toggle between the 2 different print formats - Single line spacing  or double line spacing .

For information about using an external printer, see the TorqueStar Opta section at the front of this manual.

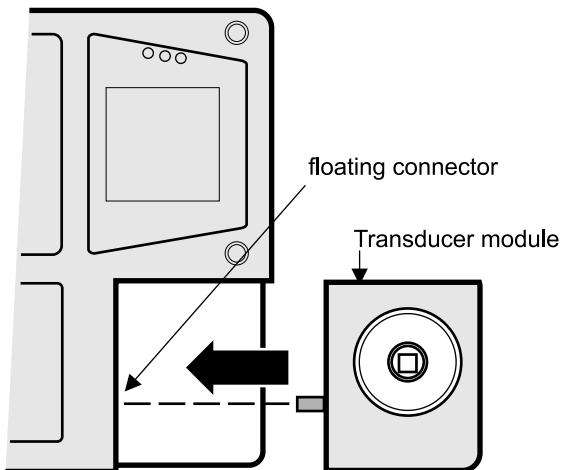
#### Icons used for printing

-  External printer
-  Integral printer
-  Internal printer format (1)
-  Internal printer format (2)
-  Autoprint on
-  Autoprint off

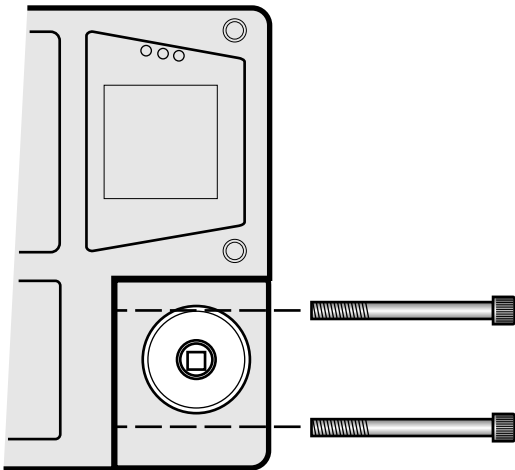
#### Main Menu screen for DTT Opta



### CONNECTING A TRANSDUCER MODULE



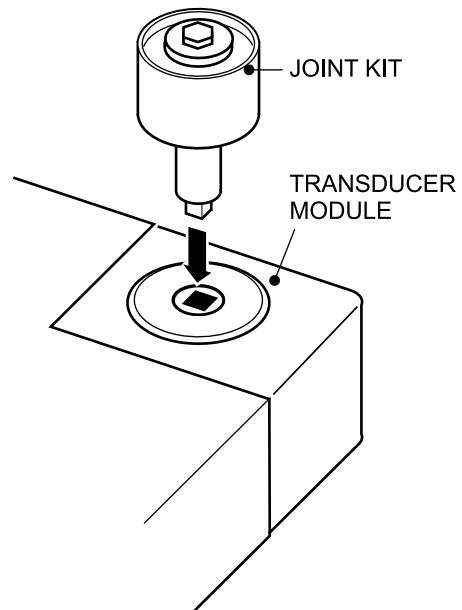
Offer up module as shown, making sure it is located fully into the floating connector...



Then fasten using the 2 hex cap head screws supplied.

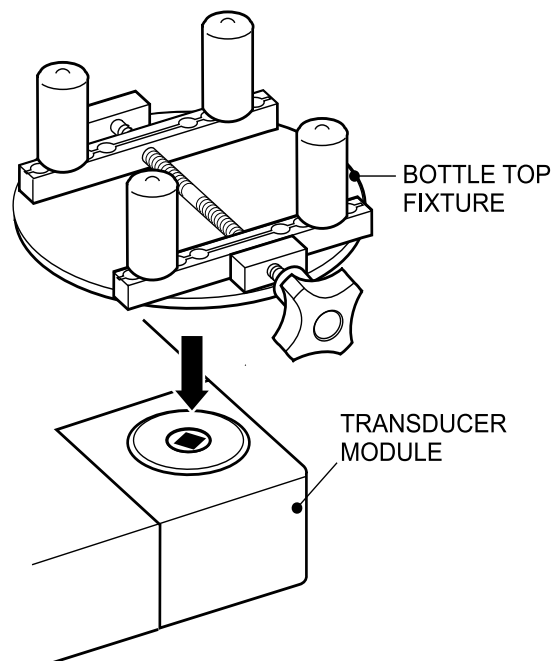
### FITTING THE JOINT KIT

Ensure joint kit is located fully into Square Drive on the Transducer Module.



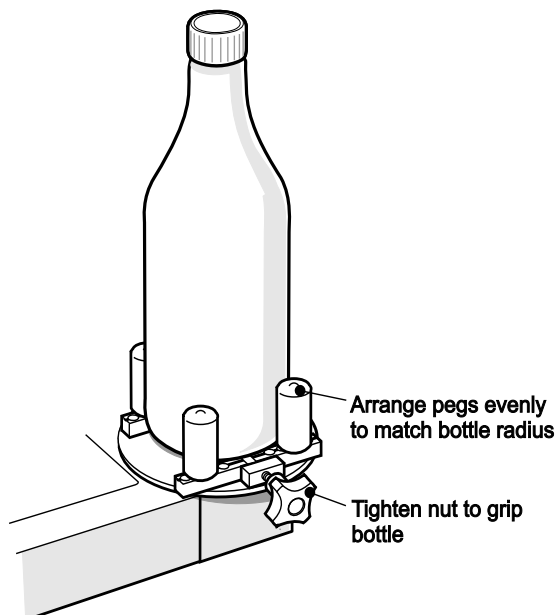
### FITTING THE BOTTLE TOP OR ADJUSTABLE COMPONENT FIXTURE

Ensure bottle top fixture is located fully into Square Drive on the Transducer Module.



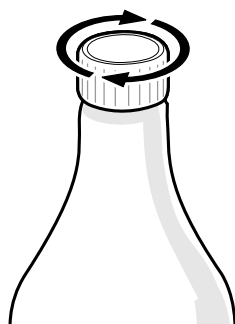
### LOADING A BOTTLE

Position the white pegs on the top, so that they grip the bottle evenly when the black adjustment knob is tightened to hold the bottle. (Try to get the bottle as near to the centre of the round turntable as possible). It is possible to clamp a bottle or container from 10mm to 130mm in diameter. Ensure that the white pegs are properly seated in the slots so that they cannot rotate when the bottle closure is turned.



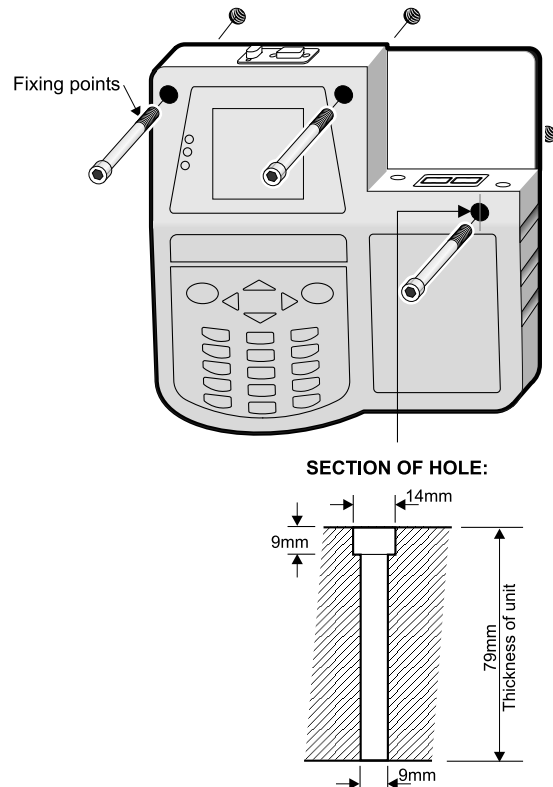
### MEASURING THE TORQUE

Select the desired operating mode from Section 1. Tighten or release the closure as required to obtain readings.

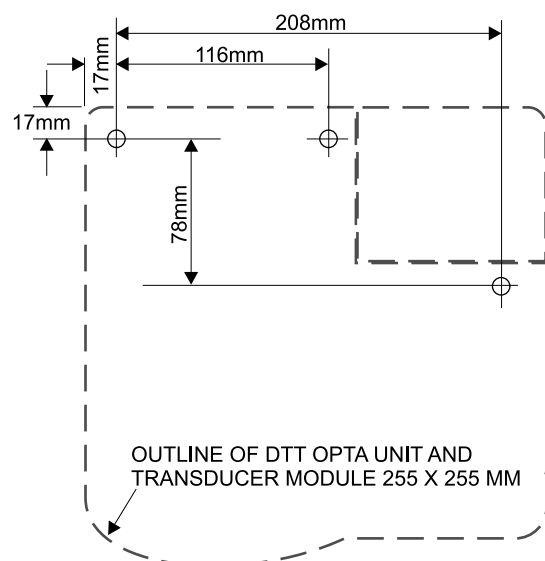


### MOUNTING THE UNIT

The DTT Opta is designed for optional wall mounting as shown in the details below. The fixings are not supplied.

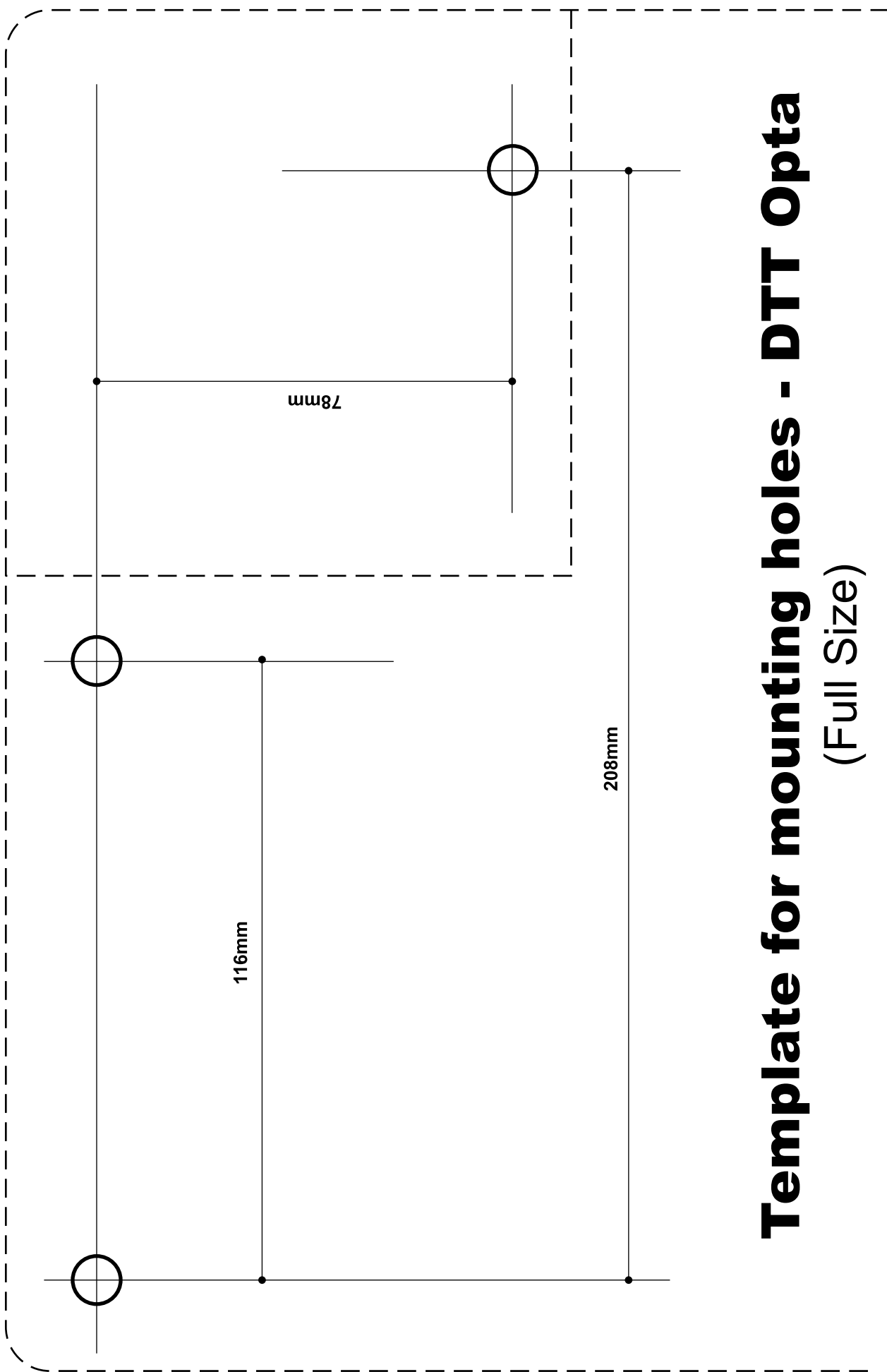


#### Fixing hole positions





Remove this page to use as a template for the fixing holes



# Template for mounting holes - DTT Opta

(Full Size)